



**Washington State
Department of Transportation**

Memorandum

Date: April 18, 2006
TO: Jerald Roseburg
North Central Region, Wenatchee
FROM: Tony Allen/Andrew Fiske
E&EP Geotechnical Branch, MS 47365
SUBJECT: SR-2, MP 103.8 to 104.8, XL-2072
Peshastin East - Interchange
Summary of Geotechnical Conditions

Attached with this memorandum is the *Summary of Geotechnical Conditions* for inclusion in the *Contract*. An electronic copy will also be made available to the North Central Region.

The documents listed as available geotechnical reports and/or memorandums should be made available either at the Project Engineer's office or on the WSDOT Internet Webpage for review by prospective bidders. Logs of all the borings referenced in the *Summary* and included in the listed reports and/or memorandums should be included in the *Contract*.

If you have questions or require further information, please contact Tony Allen at (360) 709-5450 or Andrew Fiske at (360) 709-5456.

TMA:ajf

Enclosure

cc: Dick Stoddard/Eric Schultz/Mike Bauer, Bridge & Structures, 47340

SUMMARY OF GEOTECHNICAL CONDITIONS
SR 2
PESHASTIN EAST - INTERCHANGE

The following is a summary of the geotechnical conditions and their potential impacts on the construction of the Peshastin East-Interchange.

Subsurface Conditions

Based on our field explorations, the project site appears generally underlain by soils grouped into three soil units for geotechnical distinction. The soil units are grouped primarily on the basis of engineering properties and classification and, in general, reflect depositional environments as well. The units are individually described below, and the attached boring logs contain further detail concerning the subsurface conditions.

Unit 1 – Sand with Silt and Clay lenses: This unit consists of loose to medium dense sand with varying amounts of silt and gravel. There appear to be some distinct lenses of silt and lean clay, as observed in H-1-04, H-2-04, H-3-04, H-9-04, H-11-04, and H-13-04. The silt and lean clay layer varies in thickness from about 2 feet at H-2-04 to 7 feet at H-11-04 and occurs immediately above a gravel layer (described below). The lateral extent of the silt and lean clay layer is not known. The thickness of the sand with varying amounts of silt and gravel is typically about 5 feet thick, and can be upwards of 13 feet thick in some areas. The low relative density in the upper 5 feet is likely a consequence of past cultivation.

Unit 2 – Gravel with Silt and Sand: This unit directly underlies Unit 1, and consists of dense to very dense gravel with varying amounts of silt, sand, cobbles and boulders. The gravel layer is characterized by a large fraction of cobble and boulder size material. This unit was observed to completion in H-1-04 through H-4-04, H-6-04, H-8-04 through H-10-04, H-12-04, and TP-1-04.

Unit 3 – Silty Sand: This unit underlies Unit 2 in H-5-04, H-7-04, H-11-04, H-13-04, and is interbedded with Unit 2 in H-3-04. It generally consists of dense to very dense sand with varying amounts of silt. The lateral extent of the silty sand layer is not known. This unit was observed to boring completion in the above referenced borings.

Ground and Surface Water

Evidence of groundwater was not observed in any of the test holes performed for this study at the time of drilling. Piezometers, were installed in Borings H-1-04 through H-5-04 and H-7-04 through H-9-04. Groundwater was observed in H-2-04 at 32.9 feet below ground surface (bgs) and H-3-04 at 28.5 feet bgs at seasonal highs in March of 2004. In all the remaining piezometers groundwater was not observed. It should be anticipated that the groundwater level may vary with time of year, amount of precipitation, and other factors.

Surface water observed adjacent to the project site include the Wenatchee River to the northwest and Peshastin Creek to the southeast of the proposed interchange. The Wenatchee River is approximately 500 feet from the proposed storm water pond on the northwestern side of the project, and Peshastin Creek is approximately 400 feet from borings H-4-04 and H-5-04.

Construction Considerations for Various Project Elements

Foundation Excavations

We anticipate that the spread footings will bear on very dense poorly graded gravel with varying amounts of sand, cobbles and boulders. In our experience, the upper 6 to 8 inches of the bearing surface may be disturbed during excavation.

Temporary Shoring

Temporary shoring, if needed, will be difficult to install at this project site. The presence of the gravel with silt and sand unit, which contains cobbles and boulders, will make installation of sheet piles or soldier piles difficult. Drilling of the soldier pile shafts would most likely be required, and owing to the cohesionless nature of the unit, temporary casing will probably be necessary. The casing would be needed both to stabilize the shaft and to prevent it from becoming oversized. Driving of sheet piles into this unit would probably not be feasible, and a temporary soil nail wall is also probably not feasible due to the poor face stability of the soil and staging requirements.

Temporary and Permanent Cut Slopes

The native soils in the cut areas of the project may be subject to raveling and erosion. Establishing vegetation on permanent cut slopes as soon as possible will aid in the prevention of short-term and long-term erosion. However, it should be noted that it may be difficult to establish vegetation on these slopes due to the lack of silt in the native soil that is expected to be exposed.

Compacting On-Site Materials

The upper mantle of sand with silt and clay lenses contains a variable percentage of fines (silt and clay-sized particles passing the U.S. No. 200 sieve) and can be moisture sensitive. When the moisture content of the soil is more than a few percentage points above or below the optimum moisture content it may become difficult or impossible to meet required compaction criteria. During dry weather water may need to be added to meet required compaction criteria. During wet weather it may be impossible to dry soil enough to meet required compaction requirements. Disturbance of near surface soil should be expected if earthwork is completed during wet weather.

Available Geotechnical Reports

Tony Allen and Andrew Fiske, *Geotechnical Report*, Peshastin East - Interchange, Chelan County, Washington, August 3, 2005.

